REMARKS

In this response, claims 1, 43, and 45 have been amended. New claim 49 has been added. The amendments to claims 1, 43, 45 and new claim 49 are fully supported by the originally filed application. Thus, no new matter is introduced. Reconsideration of pending claims 15-42 and 48-49 is respectfully requested.

Amendments to Withdrawn Method Claims 43 and 45

Method claims 43-47 were previously withdrawn from consideration based on an election made by the Applicant in response to the restriction requirement mailed March 31, 2009. The independent method claims 43 and 45 are currently amended to include all of the features of the independent product claim 15 to facilitate rejoinder of the method claims. The Applicants respectfully request reconsideration of the restriction requirement in light of the currently amended method claims 43 and 45 and/or rejoinder of the method claims.

Rejections under 35 U.S.C. § 112

Claim 15-42 and 48 stand rejected under 35 U.S.C. 112, first paragraph, as allegedly failing to comply with the written description requirement. More specifically, the Examiner alleges that the originally filed application fails to describe a binder that comprises both silicone and silicate. Although the Applicant disagrees with this rejection, the Applicant has nonetheless amended claim 15 to recite a "binding agent comprising silicone or silicate", as presented in originally filed claim 4 to advance prosecution of this matter. Amended claim 15 comports with the written description requirement. Accordingly, the Applicant respectfully requests that the rejection of the claims under 35 U.S.C. 112, first paragraph, be withdrawn.

Rejections under 35 U.S.C. § 102

Claims 15-20, 30-33, 36-42, and 48 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as allegedly being

obvious over WO/2003/102091 ("Takahashi"), where U.S. Patent Publication No. 2005/0277543 is used as the English translation. The Applicant respectfully traverses this rejection for at least the following reasons.

Claim 15 is directed towards a coating material that includes, among other features, *a binding agent comprising silicone or silicate in an amount of about 10 to about 30 weight percent of the coating material*. The Examiner relies on examples 22 and 23 of Takahashi to teach this feature, which allegedly describe a silicone emulsion in an amount of 10 weight percent of the coating material based on a 40% by weight solids content in the coating composition (e.g., 40% x 25% silicone of Takahashi's Table 11). *See* Takahashi, Tables 11-13; pars. [0291], [0296], and [0190]. However, the silicone of examples 22 and 23 has a resin content of only 50% as taught in par. [0263] of Takahashi, making the weight percent of the silicone half of what is suggested by the Examiner. That is, the silicone described in the cited passages of Takahashi fails to teach a binding agent comprising silicone or silicate in an amount of about 10 to about 30 weight percent of the coating material. Accordingly, the Applicant respectfully requests that the rejection of claim 15 based on Takahashi be withdrawn.

Claim 15 is further directed towards *a coating material for coating facades and other building surfaces with a self-cleaning and self-regenerating surface*, the coating material including among other features, *a binding agent, and a photocatalytically active agent, wherein the binding agent is capable of decomposing due at least in part by a photocatalytic action of the photocatalytically active agent to form a microstructured, self-cleaning surface that photocatalytically reduces by about 0.1 µm or more per year in response to external weathering*. Takahashi fails to disclose or suggest a microstructured, self-cleaning surface that is formed by decomposition of the binding agent, as claimed.

As described in par. [0012] of the English translation of the WO-publication of the current application (US2007/0157853, hereafter the "English translation"), a self-cleaning surface can be obtained by producing a surface with a specific microstructure that results in a superhydrophobicity, which is referred to as the Lotus effect. The

triggering of the Lotus effect for selected microstructures is described in an article by Stratakis et al., entitled "*Laser structuring of water-repellent biomimetic surfaces*," a copy of which accompanies this response (hereafter "Stratakis").

Such microstructures can be damaged, for example, by particles carried along with the air as explained in par. [0017] of the English translation. The destruction of the microstructures generally brings about the loss of the self-cleaning properties.

According to the present invention, however, damaged microstructures can be automatically regenerated by the constant generation of new microstructures due to the catalytic decomposition of binding agent material in between the filler particles. *See*, e.g., par. [0018] of the English translation. Such an automatic regeneration is possible only if the filler, the photocatalytic particles and the decomposable binding agent are dispersed homogeneously within the coating composition, where the binding agent forms the self-cleaning surface. Otherwise, if the coating composition has two or more structurally different (non-homogeneous) layers, the composition's second layer cannot replace the first, damaged layer, meaning that the automatic formation/regeneration of the self-cleaning surface by decomposition is not possible.

The coatings disclosed and taught in Takahashi comprise at least two structurally different layers, where an upper layer consists mostly of photocatalytic particles only. For example, in par. [0038], Takahashi teaches choosing the particle size of the photocatalytic agent and the particle size of the particles dispersed in the hydrophobic-resin emulsion such that the relatively small photocatalytic particles move upward to form the upper layer and the relatively large particles dispersed in the hydrophobic-resin emulsion move downward. Such multi-layer coating provides that i) the contact angle of water on the coating film surface is small even immediately after the application of the coating material, ii) adhesion to the base material having hydrophobic substances is enhanced due to the fact that the layer beneath the photocatalytic particle layer consists essentially of the hydrophobic particles, and iii) the coating film can be exposed to sunlight for a long time because the photodegradable particles dispersed in the

hydrophobic resin emulsion are hidden underneath the upper layer consisting mostly of photocatalytic particles.

The multi-layer coating as taught by Takahashi fails to disclose or suggest a microstructured, self-cleaning surface that is formed by decomposition of the binding agent. That is, any damaged microstructures (if present) of Takahashi's upper layer cannot be replaced by the structurally different layer below. Accordingly, the Applicant respectfully requests that the rejection of claim 15 be withdrawn for this additional reason.

Further, Takihashi describes that a UV ray shielding effect of the upper layer depends on a thickness of the coating film. For example, in par. [0176], Takahashi teaches that a sufficiently thick film may have a UV ray shielding efficiency of 99.9% or more, which makes it possible to prevent the substrate from deteriorating due to UV rays. In at least this regard, Takahashi further fails to disclose or suggest that the binding agent is capable of decomposing due at least in part by a photocatalytic action of the photocatalytically active agent to form the self-cleaning surface. Accordingly, the Applicant respectfully requests that the rejection of claim 15 be withdrawn for at least this additional reason.

Claims 16-42 and 48 depend, either directly or indirectly, from claim 15 and thus include the features of claim 15, which have been distinguished over Takahashi above. It is respectfully submitted that the rejected dependent claims are likewise not anticipated or rendered obvious by Takahashi using similar reasoning as provided for independent claim 15.

Rejections under 35 U.S.C. § 103

Claims 21-29 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Takahashi as applied to claims 15-20, 30-33, 36-42, and 48 above, in view of U.S. Patent No. 6,037,289 ("Chopin"). Claims 15-20, 30-42, and 48 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No.

6,337,129 ("Watanabe"). The Applicant respectfully traverses these rejections for at least the following reasons.

In the second paragraph on page 15 of the Office Action, it is stated that "*it was and still is the Examiner's position that Watanabe teaches similar compositions to instantly claimed […]*". However, Watanabe fails to disclose or suggest the compositions as claimed in claim 15.

Example 1 of Watanabe is hydrophilified to 0° in terms of the contact angle (*See* Watanabe, col. 19, lines 16-18) whereas the microstructured, self-cleaning surface of claim 15 results in a superhydrophobicity, known as the Lotus Effect. *See* par. [0012] of the English Translation. For at least this reason, Watanabe does not teach compositions similar to the instantly claimed compositions, but rather the complete opposite. Accordingly, the Applicant respectfully requests that the 103 rejection of claim 15 relying on Watanabe be withdrawn.

The same also applies to example 2 of Watanabe, which teaches a photocatalytic particle content of 66 parts by weight, whereas claim 15 claims a content of 2 to 15% by weight. For at least this additional reason, Watanabe does not teach compositions similar to the instantly claimed compositions. Accordingly, the Applicant respectfully requests that the 103 rejection of claim 15 relying on Watanabe be withdrawn for at least this additional reason.

In the last paragraph of page 8 of the Office Action, the Examiner makes reference to line 50 of col. 14 of Watanabe, stating that "*Watanabe teach in preferred embodiments that that the hydrophobic resin layer preferably comprises 1-80% by weight photocatalytic oxides*." Such teaching, when viewed in the context of the whole reference, fails to suggest the claimed composition for the following reasons.

The range of 1-80% by weight photocatalytic oxides is taught in connection with Watanabe's FIG. 4. As can be clearly seen in FIG. 4, the photocatalytic oxide and the inorganic oxide are present in an exposed location on the outermost surface of the surface layer. The importance of the exposure of the photocatalytic oxide can be seen in lines 26-30 of col. 17, where Watanabe suggests removing the surface layer of the

resin layer to expose a desired amount of photocatalytic oxide. However, such removal is not necessary if a sufficient amount of photocatalytic oxide is used because the degree of the exposure of the photocatalytic oxide is generally proportional to the concentration of the photocatalytic oxide in the coating liquid. *See* Watanabe, col. 17, lines 18-21. Thus, in reading Watanabe as a whole, a person having ordinary skill in the art would understand that the lower range of the 1-80% by weight range is disadvantageous. Accordingly, the person having ordinary skill in the art would understand that the more preferred range of the photocatalytic oxide is 20-50% by weight, as expressly taught by Watanabe.

Thus, when considered in its entirety, Watanabe actually teaches away from using the lower amount of photocatalytic oxide. It is respectfully submitted that a person having ordinary skill in the art would not be motivated to use a photocatalytically active agent in an amount of about 2 to about 15 weight percent of the coating material based on the teachings of Watanabe, but would rather be motivated to use a higher range outside of the claimed range. Thus, Watanabe fails to fairly suggest the claimed range. Accordingly, the Applicant respectfully requests that the 103(a) rejection of claim 15 be withdrawn for at least this additional reason.

Watanabe also fails to disclose or fairly suggest a binding agent comprising silicone or silicate in an amount of about 10 to about 30 weight percent of the coating material, as claimed. In the sentence bridging page 8 and page 9 of the Office Action, the Examiner states that the amount of photocatalytic oxides and inorganic oxide particles described in Watanabe "*leaves a [calculated] remainder of hydrophobic binder in amounts of up to 94% by weight.*" When doing this simplified calculation, the Examiner ignores that the compositions of Watanabe preferably comprise at least two different kinds of hydrophobic binders, i.e., silicon resin and a water-repellent fluororesin. *See* Watanabe, col. 9, lines 45-51. Watanabe teaches that the hydrophobic fluororesin is preferably present in the surface layer in an amount of 20-60% by weight. *See* Watanabe, col. 6, lines 40-41. Considering that the preferred range for the photocatalytic oxide is 20-50%, as previously discussed, the person

having ordinary skill in the art would understand that the amount of silicon resin must be low.

In order to get a more precise indication, the person having ordinary skill in the art would look at the examples (e.g., example 1 and 2) of Watanabe, which teach that the preferred amount of silicon resin is 5 parts per weight of silicon. This is in clear contrast to the claimed composition of a binding agent comprising silicone or silicate in amounts of 10 to 30 weight percent. Thus, Watanabe fails to fairly suggest the claimed compositional ranges of the binding agent and may actually teach away from the claimed ranges. Accordingly, the Applicant respectfully requests that the 103(a) rejection of claim 15 be withdrawn for at least this additional reason.

It is further noted that in Watanabe, the fluororesin is added to obtain a light-fast composition and *not* a self-cleaning surface with self-regenerating properties as previously discussed. *See* Watanabe, col. 12, line 42. Thus, a person having ordinary skill in the art at the time of the invention would have had no motivation to adjust the amount of silicon binder and to adjust the amount of photocatalytically active agent to the instantly claimed ranges because the development of a self-cleaning surface, which is self-regenerating involves more than only routine skill in the art. Accordingly, the Applicant respectfully requests that the 103(a) rejection of claim 15 be withdrawn for at least this additional reason.

On page 15 of the Office Action, the Examiner states that "*the instantly claimed film properties are inherent to the coating composition of Watanabe*." Clearly, this is not the case. The claimed microstructured, self-cleaning surface is formed by a binding agent that is capable of decomposing due at least in part by a photocatalytic action of the photocatalytically active agent. The micro-structured, self-cleaning surface that regenerates in this way is determined *inter alia* by the amount of the filler, photocatalytically active agent, and the amount of decomposable binding agent.

Referring to Figure 1 of the Stratakis article, it is clear that a composition which comprises 66 parts per weight of titanium oxide particles (e.g., example 2 of Watanabe) instead of 15 weight percent will result in a substantially different surface structure.

Similarly, a composition which comprises 5 weight percent instead of 10 weight percent of decomposable binding agent (e.g., example 1 of Watanabe) will also have a different surface structure, i.e., a surface structure with less and/or smaller "holes".

Additionally, a composition that comprises more than twice the amount of titanium oxide than silicon resin will have very different chalking properties. This is confirmed by col. 4, lines 10-17 of Watanabe, which teach a reversible process, not an irreversible process, the latter being the basis of automatic self-generation of the self-cleaning surface.

Moroever, adding a light fast resin as taught by Watanabe will further modify the microstructured, self-cleaning surface after exposure to UV radiation. More specifically, the compositions of Watanabe are likely to have "fluororesin-mountains" after UV exposure and thus, a structurally different surface.

For at least these reasons, the instantly claimed film properties are not inherent to the coating composition of Watanabe. Accordingly, the Applicant respectfully requests that the 103(a) rejection of claim 15 be withdrawn for at least this additional reason.

Claims 16-42 and 48 depend, either directly or indirectly, from and thus include the features of claim 15, which have been distinguished over Watanabe above. Chopin fails to cure the deficiencies discussed in connection with Watanabe and Takahashi for claim 15. Thus, the cited references, whether considered alone or in combination, fail to disclose or suggest all of the features of independent claim 15. It is respectfully submitted that the rejected dependent claims are likewise not rendered obvious by the cited references, whether considered alone or in combination, using similar reasoning as provided for independent claim 15.

New Claim

New claim 49 has been added. Claim 49 finds support in at least par. [0032] of the specification. Claim 49 depends from claim 15 and, thus, includes the features of

claim 15. It is respectfully submitted that claim 49 is allowable over the cited references for at least the reasons claim 15 is allowable.

Conclusion

For at least these reasons, a Notice of Allowance is earnestly solicited. Please contact the undersigned at (503) 796-2099 regarding any questions or concerns associated with the present matter. If any fees are due in connection with this paper, the Commissioner is authorized to charge Deposit Account 500393.

Respectfully submitted,

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